

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of manufacturing a semiconductor device, comprising:

- forming an insulating layer on a semiconductor substrate;
- forming a contact hole on the insulating layer;
- depositing a tungsten nitride layer as a barrier metal layer in the contact hole and on the insulating layer using an atomic layer deposition process; and wherein said depositing the tungsten nitride layer comprises:
 - depositing a silicon single atomic layer in the contact hole;
 - forming a tungsten single atomic layer after said depositing the single silicon single atomic layer; and
 - forming the tungsten nitride layer by plasma-processing the tungsten single atomic layer; and
- performing the atomic layer deposition process a plurality of times to produce a barrier metal layer having a desired thickness.

2. (Cancelled)

3. (Original) The method of claim 1, further comprising:
performing a deposition process to deposit a tungsten layer to fill the contact hole.

4 (Original) The method according to claim 3, wherein the barrier metal layer is a tungsten nitride layer.

5. (Original) The method of claim 4, wherein the tungsten nitride layer and the tungsten layer are in-situ deposited in a reaction chamber.

6. (Original) The method of claim 4, wherein the tungsten nitride layer and the tungsten layer are in-situ deposited in a reaction chamber for depositing the tungsten layer.

7. (Original) The method of claim 5, wherein the reaction chamber is maintained at a pressure of 10 to 350 Torr.

8. (Original) The method of claim 5, wherein the reaction chamber is maintained at a temperature of 250 to 550°C.

9. (Cancelled).

10. (Original) The method according to claim 9, wherein the silicon single atomic layer is deposited using SiH₄ gas.

11. (Original) The method of claim 10, wherein the SiH₄ gas is injected at a flow rate of 5 to 200 SCCM.

12. (Original) The method according to claim 9, wherein the tungsten single atomic layer is formed using WF₆ gas, wherein the silicon of the silicon single atomic layer reacts with WF₆ gas.

13. (Original) The method of claim 12, wherein the WF₆ gas is injected at a flow rate of 5 to 200 SCCM.

14. (Original) The method of claim 9, wherein the tungsten nitride layer is formed by plasma-processing the tungsten single atomic layer using nitrogen gas.

15. (Original) The method of claim 1, wherein the barrier layer has a total thickness of 3 to 100Å .

16. (Original) The method of claim 2, wherein the tungsten nitride layer has a total thickness of 3 to 100Å .